REMARKS

Applicant hereby responds to the Office Action of February 4, 2008, in the above-referenced patent application. Applicant thanks the Examiner for carefully considering the application.

Status of Claims

Claims 1, 4, 5, 7, 9-11, 13-28, 37, 49-51, 53-56, 60 and 61 are pending in the above-referenced patent application. Claims 1, 4, 37, 49, 50, 53, 54, 55, 56, 60 and 61 are independent. Claims 2, 3, 6, 8, 12, 29-36, 38-48, 52, 57-59, were withdrawn from consideration.

Claim 26 is rejected under paragraph 35 U.S.C. § 112, second paragraph as being unclear. Claims 1, 4-5, 7, 9-11, 13, 15, 16, 18, 19, 24-25 and 37 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,272,261 ("Matsuoka") in view of U.S. Patent No. 6,128,398 (Kuperstein). Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Matsuoka and Kuperstein in view of an article by Garard de Haan ("Garard de Haan"). Claims 17 and 20-23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsuoka and Kuperstein in view of U.S. Patent Application Pub. No. 2001-0031100 ("Rising III"). Claims 27 and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsuoka and Kuperstein. Claim 49 was rejected under 35 U.S.C. §103(a) as being unpatentable over Matsuoka and Kuperstein in view of U.S. Patent No. 5,815,198 ("Vachtsevanos"). Claims 50-51, 53-56 and 60-61 were rejected under 35 U.S.C. §103(a) as being unpatentable over Matsuoka and Kuperstein in view of U.S. Patent No. 4,468,688 ("Gabriel").

Claim Amendments

Claims 1, 4, 7, 9-11, 24-28, 37, 49,-50, 53-56 and 60-61 have been amended for clarification. No new matter has been added by way of these amendments.

Rejection under 35 U.S.C. §112

Applicant has amended claim 26 by deleting the capital letter "N" and adding a small italicized letter "*n*" with respect to the different edge directions. Therefore, the consistency and

clarity issues are overcome.

Accordingly, withdrawal of the rejection of claim 26 is respectfully requested.

Rejection under 35 U.S.C. §103(a)

Claims 1, 4-5, 7, 9-11, 13, 15, 16, 18, 19, 24-25 and 37

Rejection of the claims 1, 4-5, 7, 9-11, 13, 15, 16, 18, 19, 24-25 and 37 is respectfully traversed because, for at least the following reasons, Matsuoka and Kuperstein, whether considered separately or in combination, fail to show or suggest all of the claimed limitations. According to MPEP §2142

> [t]he key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007) noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Federal Circuit has stated that 'rejections on obviousness cannot be sustained with mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.' *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at __, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval).

Further, according to MPEP §2143, "[T]he Supreme Court in *KSR International Co. v. Teleflex, Inc.* 550 U.S. ___, ___, 82 USPQ2d 1395-1397 (2007) identified a number of rationales to support a conclusion of obviousness which are consistent with the proper "functional approach" to the determination of obviousness as laid down in *Graham*." And, according to MPEP §2143.01, [o]bviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006). Further, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art." *KSR International Co. v. Teleflex, Inc.* 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007).

Additionally, according to MPEP §2143

> [a] statement that modification of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Pat. App. & Inter. 1993).

The claimed invention is directed to image deinterlacing using *interpolation neural networks*. Independent claim 1 requires, in part, "using a dedicated *interpolation neural network* for each of a plurality of different edge directions to provide an interpolated value of the image" (emphasis added). Independent claim 4 requires in part "selecting an *interpolation neural network* based upon the determined edge direction; and interpolating a value of the image at the location using the selected *interpolation neural network*" (emphasis added). And independent claim 37 requires in part a "system comprising a dedicated *interpolation neural network* configured to provide an interpolated value for each of a plurality of different edge directions in the image" (emphasis added).

Matsuoka discloses using a neural network that selects different filters that are suited for edge areas and non-edge areas (see Matsuoka, Abstract; col. 6, lines 14-16, Fig. 7). It is clear that the neural network used in Matsuoka is not an *interpolation neural network*, as required by Applicant's claimed invention (independent claims 1, 4 and 37), because Matsuoka only discloses different filtering neural networks.

Kuperstein discloses a pattern recognition system that uses five neural networks that are used to find x and y coordinates (i.e., location) of a person's eyes having the mean gaze in the selected band (Kuperstein, col. 8, lines 19-24). It is clear that the neural network used in Kuperstein is not an *interpolation neural network*, as required by Applicant's claimed invention (independent claims 1, 4 and 37), because Kuperstein only discloses different coordinate determining neural networks.

Therefore, even if Matsuoka is combined with Kuperstein, the result would still not teach, disclose or suggest Applicant's independent claim 1 limitations of "using a dedicated *interpolation neural network* for each of a plurality of different edge directions to provide an interpolated value of the image" (emphasis added), independent claim 4 limitations of "selecting an *interpolation neural network* based upon the determined edge direction; and interpolating a value of the image at the location using the selected *interpolation neural network*" (emphasis added), or independent claim 37 limitations of "system comprising a dedicated *interpolation neural network* configured to provide an interpolated value for each of a plurality of different edge directions in the image" (emphasis added).

Moreover, by viewing the disclosures of Matsuoka and Kuperstein, one cannot jump to the conclusion of obviousness without impermissible hindsight. According to MPEP 2141.01, "[t]he requirement 'at the time the invention was made' is to avoid impermissible hindsight."

> '[i]t is difficult but necessary that the decision maker forget what he or she has been taught ... about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art.' W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

Applicant submits that without first reviewing Applicant's disclosure, no thought, whatsoever, would have been made to selecting an *interpolation neural network.*

Further, the assertions made in the Office Action on pages 4 and 10-11 that lead to a conclusion of obviousness are not explicit and the basic requirements of an articulated *rationale* under MPEP 2143 cannot be found. Additionally, since neither Matsuoka, Kuperstein, and therefore, nor the combination of the two, teach, disclose or suggest all the limitations of Applicant's claims 1, 4 and 37, as listed above, Applicant's claims 1, 4 and 37 are not obvious over Matsuoka in view of Kuperstein since a *prima facie* case of obviousness has not been met

under MPEP §2142. Thus, claims 1, 4 and 37 of the present application are patentable over Matsuoka and Kuperstein for at least the reasons set forth above. Additionally, the claims that directly or indirectly depend on amended claim 4, namely claims 5, 7, 9-11, 13, 15, 16, 18, 19, 24-25, are allowable for at least the same reasons.

Regarding dependent claim 7, Matsuoka further fails to disclose "selecting an interpolation neural network comprises the steps of *determining which of a plurality of different interpolation neural networks is most closely associated with the determined edge direction*" (emphasis added). The combined teachings of Matsuoka and Kuperstein do not teach, disclose or even suggest selecting an interpolation neural network. Thus, claim 7 is patentable over Matsuoka in view of Kuperstein.

Regarding dependent claims 9-11, Applicant respectfully submits that the combined teachings of Matsuoka and Kuperstein further fails to disclose "selecting *an interpolation neural network* comprises the steps of mirroring a data set to facilitate use of a common neural network for symmetric edge directions" (claim 9), "selecting *an interpolation neural network* comprises the steps of vertically mirroring a data set to facilitate use of a common neural network for symmetric edges" (claim 10), and "selecting *an interpolation neural network* comprises the steps of selecting a substantially linear neural network with one neuron" (claim 11). The combined teachings of Matsuoka and Kuperstein do not teach, disclose or even suggest selecting an interpolation neural network. Thus, claims 9-11 are patentable over Matsuoka in view of Kuperstein.

Regarding dependent claims 24-25, Applicant respectfully submits that the combined teachings of Matsuoka and Kuperstein further fails to disclose "inputs to the selected *interpolation neural network* comprise values of neighboring portions of the image with respect to the location where interpolation is desired" (claim 24), and "inputs to the selected *interpolation neural network* comprise values of neighboring pixels with respect to a pixel at the location where interpolation is desired" (claim 11). The combined teachings of Matsuoka and Kuperstein do not teach, disclose or even suggest selecting an interpolation neural network.

Thus, claims 24-25 are patentable over Matsuoka in view of Kuperstein.

Accordingly, withdrawal of the rejection of claims is respectfully requested.

Claim 14

Rejection of claim 14 is respectfully traversed because, for at least the following reasons, Matsuoka, Kuperstein and Garad de Haan, whether considered separately or in combination, fail to show or suggest all of the claimed limitations.

Applicant's claim 14 directly depends on amended independent claim 4. As discussed above, Matsuoka in view of Kuperstein fails to teach, disclose or suggest the limitations in claim 4 of "*selecting an interpolation neural network* based upon the determined edge direction; and interpolating a value of the image at the location using the selected *interpolation neural network*" (emphasis added). Garad de Haan, like Matsuoka discussed above, also fails to show or suggest such a limitation, and thus fails to supply that which Matsuoka and Kuperstein lack. This is also evidenced by the fact that Garad de Haan was relied upon in the instant Office Action merely to supply deinterlacing.

In view of the above, claim 14 is patentable over Matsuoka and Kuperstein in view of Garad de Haan for at least the reasons set forth above.

Accordingly, withdrawal of the rejection of claim 14 is respectfully requested.

Claims 17 and 20-23

Rejection of claims 17 and 20-23 is respectfully traversed because, for at least the following reasons, Matsuoka and Kuperstein in view of Rising III, whether considered separately or in combination, fail to show or suggest all of the claimed limitations.

Applicant's claims 17 and 20-23 directly depend on Applicant's amended independent claim 4. As discussed above, Matsuoka and Kuperstein fail to show or suggest the limitations in

claim 4 of "*selecting an interpolation neural network* based upon the determined edge direction; and interpolating a value of the image at the location using the selected *interpolation neural network*" (emphasis added). Rising III, like Matsuoka and Kuperstein discussed above, also fails to show or suggest such a limitation, and thus fails to supply that which Matsuoka and Kuperstein lack. This is also evidenced by the fact that Rising III was relied upon in the instant Office Action merely to supply interpolation details.

In view of the above, claims 17 and 20-23 are patentable over Matsuoka and Kuperstein in view of Rising III for at least the reasons set forth above.

Accordingly, withdrawal of the rejection of claims 17 and 20-23 is respectfully requested.

Claims 27 and 28

Rejection of claims 27 and 28 is respectfully traversed because, for at least the following reasons, Matsuoka and Kuperstein fail to show or suggest all of the claimed limitations.

Applicant's claims 27 and 28 directly depend on Applicant's amended independent claim 4. As discussed above, Matsuoka and Kuperstein fail to show or suggest the limitations in claim 4 of "*selecting an interpolation neural network* based upon the determined edge direction; and interpolating a value of the image at the location using the selected *interpolation neural network*" (emphasis added). In view of the above, claims 27 and 28 are patentable over Matsuoka and Kuperstein for at least the reasons set forth above.

Additionally, the combined teachings of Matsuoka and Kuperstein fail to teach, disclose or suggest Applicant's claim 27 requires "between approximately 40 and approximately 80 samples are provided as *inputs to the interpolation neural network*" (emphasis added), and claim 28 requires "approximately 60 samples are provided on *inputs to the interpolation neural network*" (emphasis added).

Accordingly, withdrawal of the rejection of claims 27 and 28 is respectfully requested.

Claim 49

Rejection of claim 49 is respectfully traversed because, for at least the following reasons, Matsuoka and Kuperstein in view of Vachtsevanos, whether considered separately or in combination, fail to show or suggest all of the claimed limitations.

As discussed above, Matsuoka and Kuperstein fails to show or suggest "selecting an *interpolation neural network*" (emphasis added), as required by amended independent claim 49. Vachtsevanos, like Matsuoka and Kuperstein discussed above, also fails to show or suggest such a limitation, and thus fails to supply that which Matsuoka and Kuperstein lack. This is also evidenced by the fact that Vachtsevanos was relied upon in the instant Office Action merely to supply omitted scan line and interlaced image.

Moreover, by viewing the disclosures of Matsuoka and Kuperstein in view of Vachtsevanos, one cannot jump to the conclusion of obviousness without impermissible hindsight. Applicant submits that without first reviewing Applicant's disclosure, no thought, whatsoever, would have been made to selecting an *interpolation neural network.*

In view of the above, claim 49 is patentable over Matsuoka and Kuperstein in view of Vachtsevanos for at least the reasons set forth above.

Accordingly, withdrawal of the rejection of claim 49 is respectfully requested.

Claims 50-51, 53-56 and 60-61

Rejection of claims 50-51, 53-56 and 60-61 is respectfully traversed because, for at least the following reasons, Matsuoka and Kuperstein in view of Gabriel, whether considered separately or in combination, fail to show or suggest all of the claimed limitations.

As discussed above, Matsuoka and Kuperstein fail to teach disclose or suggest "selecting an *interpolation neural network,*" as required by independent claims 50, 55, 56, 60, and 61.

Accordingly, Matsuoka and Kuperstein also fail to teach, disclose or suggest "an *interpolation neural network selector*" (emphasis added), as required by independent claims 53 and 54. Gabriel, like Matsuoka and Kuperstein discussed above, also fails to show or suggest such a limitation, and thus fails to supply that which Matsuoka and Kuperstein lack. This is also evidenced by the fact that Gabriel was relied upon in the instant Office Action merely to supply interpolation details.

Moreover, by viewing the disclosures of Matsuoka and Kuperstein in view of Gabriel, one cannot jump to the conclusion of obviousness without impermissible hindsight. Applicant submits that without first reviewing Applicant's disclosure, no thought, whatsoever, would have been made to selecting an *interpolation neural network.*

In view of the above, independent claims 50, 53, 54, 55, 56, 60, and 61 are patentable over Matsuoka and Kuperstein in view of Gabriel for at least the reasons set forth above. Additionally, since claim 51 directly depends on independent claim 50, claim 51 is allowable for at least the same reasons.

Accordingly, withdrawal of the rejection of claims 50-51, 53-56 and 60-61 is respectfully requested.

Rejoinder

As discussed above, independent claim 4 is allowable. Thus, dependent claims 6, 8, 12, 29-36 should be allowable for at least the same reasons. Accordingly, rejoinder of withdrawn claims 6, 8, 12, 29-36 is respectfully requested.

CONCLUSION

In view of the foregoing amendments remarks, Applicant respectfully requests that the rejections of the claims be withdrawn, and that the case be passed to issue. If the Examiner feels that a telephone interview would be helpful to the further prosecution of this case, Applicant respectfully requests that the undersigned attorney be contacted at the listed telephone number.

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Respectfully submitted,

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